



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/918,439	08/01/2001	Hideki Kato	110287	4747
25944	7590	06/29/2004		
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			EXAMINER BERNATZ, KEVIN M	
			ART UNIT	PAPER NUMBER
			1773	
DATE MAILED: 06/29/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/918,439

Applicant(s)

KATO ET AL.

Examiner

Kevin M Bernatz

Art Unit

1773

eb

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,7 and 8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,7 and 8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Request for Continued Examination***

2. The Request for Continued Examination (RCE) under 37 CFR 1.53 (d) filed on April 26, 2004 is acceptable and a RCE has been established. An action on the RCE follows.

### ***Claim Rejections - 35 USC § 103***

3. Claims 1, 3, 4 and 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (U.S. Patent App. No. 2001/0048643 A1) in view of Li (U.S. Patent No. 6,487,014 B2)

Regarding claim 1, Inoue et al. disclose an optical isolator (*Paragraphs 0004 and 0081*) which is also a magneto-optical body comprising two dielectric multilayered films (*Figure 13, elements 13*) and a magnetic film (*element 14*) provided between the two dielectric multilayered films, wherein the two dielectric multilayered films comprise two types of "alternately stacked dielectric layers having different refractive indexes" (*Paragraph 0093*), alternatively laminated with each other (*elements 22 and 23*) regular in thickness (*Paragraphs 0011 and 0090*).

Inoue et al. further discloses a low index of refraction material meeting applicants' claimed  $\text{SiO}_2$  limitation (*Paragraph 0140 –  $\text{SiO}_2$* ) and a high index of refraction material which possesses an index of refraction close to 3.0 (*Paragraph 0140 – SiN: "the refractive index  $M$  of the SiN layer is 2.7"*). Inoue et al. fail to explicitly disclose using a material having an index of refraction of at least 3 for the high index of refraction material.

However, Li teach structures for use in optical isolators (*Title; col. 1, lines 12 – 30 and lines 64; and col. 9, lines 4 – 9: "Several thin films PBS embodiments having thin films PBS coatings PBS –1A ... have been designed for an optical device, such as an optical ..isolator"*) wherein a stacked film of high (e.g. "Si" with  $n = \sim 3.49$ ) and low refractive index material (e.g. " $\text{SiO}_2$ ") are used in order to produce a device with high transmission over a wide wavelength ( $\lambda$ ) and good extinction ratios (*col. 9, lines 4 – 30; col. 10, lines 1 – 22; and col. 14, lines 46 – 55*), wherein these laminates have a "wider angular field [which] allows a less strict beam alignment" (*col. 14, lines 54 – 56*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Inoue et al. to use a stacked film of Si ( $n \sim 3.49$ ) and  $\text{SiO}_2$  as taught by Li in order to produce a device with high transmission over a wide wavelength ( $\lambda$ ) and good extinction ratios, wherein these laminates have a "wider angular field [which] allows a less strict beam alignment"

Art Unit: 1773

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. in view of Li as applied above, and further in view Yamada (U.S. Patent No. 6,448,850 B1).

Inoue et al. and Li are relied upon as described above.

Neither Inoue et al. nor Li disclose replacing Si with Ge.

However, the Examiner deems that Si and Ge are known art-recognized equivalents in terms of high refractive index dielectric materials, as taught by Yamada (col. 4, lines 4 – 17: *“the dielectric waveguide is a material of high refractive index having transparency in an operating wave length region. The dielectric waveguide ... may consist of IV group semiconductors such as Si and Ge ...”*).

Substitution of equivalents requires no express motivation as long as the prior art recognizes the equivalency. In the instant case, Si and Ge are equivalents in the field of high refractive index dielectric materials, as evidenced by the above cited art. *In re Fount* 213 USPQ 532 (CCPA 1982); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *Graver Tank & Mfg. Co. Inc. v. Linde Air Products Co.* 85 USPQ 328 (USSC 1950).

### ***Response to Arguments***

5. The rejection of claims 1, 3, 4, 7 and 8 under 35 U.S.C § 103(a) – Inoue et al. in view of Li, alone or in combination with Yamada et al.

Applicant(s) argue(s) that the combination of Li and Inoue et al. is improper because the combination would have “resulted in a structure that cannot obtain a large

rotation angle", which is desired by the Inoue et al. invention (*page 2 of response*). The examiner respectfully disagrees.

The Examiner notes that Inoue et al. disclose many embodiments centered around the same common structure, specifically a center magnetic layer with alternating dielectric layers on each side of the magnetic layer. I.e. (dielectric 1/dielectric 2)<sub>n</sub> <magnetic> (dielectric 1/dielectric 2)<sub>m</sub>. Inoue et al. teach laminates of alternating SiO<sub>2</sub> and SiN layers (*Paragraph 0140*), which is extremely similar to the structure taught by Li of alternating SiO<sub>2</sub> and Si layers. The only difference between the two laminates is that SiN has an index of refraction of about 2.7 and Si has an index of refraction of about 3.5. Since Inoue et al. explicitly recognizes using layers of different index of refraction (*Paragraph 0093*), the Examiner deems that since Li teaches improved optical properties for the Si/SiO<sub>2</sub> laminates, one of ordinary skill in the art would have been motivated to use Si/SiO<sub>2</sub> laminates instead of the SiN/SiO<sub>2</sub> laminates in the Inoue et al. invention and there is no evidence that such a use would not function within the teachings of Inoue et al. above.

Applicants' further argue that Inoue et al. does not disclose the widening of the wavelength operating range and "a modification of Li's multilayer film with Inoue's magneto-optical recording medium would not have resulted in a multilayer film with a 100% transmissivity of s-polarized light ... and would thus have rendered Li unsatisfactory for its own intended purpose" (*page 3 of response*).

Applicants arguments have been considered but are moot given that the rejection of record is Inoue et al. in view of Li, not Li in view of Inoue et al. As such, the Examiner

does not need to provide motivation for modifying Li's multilayer film with Inoue's magneto-optic recording medium since the Examiner has provided proper motivation already for modifying Inoue et al.'s multilayer film with Li's multilayer film.

Applicant(s) are further reminded that "the test for obviousness is not whether features of the secondary reference may be bodily incorporated into the primary reference's structure, nor whether the claimed invention is expressly suggested in any one or all of the references, rather the test is what the combined teachings would have suggested to those of ordinary skill in the art." *Ex parte Martin* 215 USPQ 543, 544 (PO BdPatApp 1981). In the instant case, Inoue et al. clearly teach a structure analogous to applicants' claimed structure, including alternating layers of high and low index of refraction materials wherein the low index of refraction material comprises SiO<sub>2</sub>. Li, ***directed to the same field of endeavor***, teach using alternating layers of Si and SiO<sub>2</sub>, and the Examiner deems that one of ordinary skill in the art would have readily appreciated that the two teachings were combinable for the reasons of record.

Finally, the Examiner notes that Li teaches using the optical device in a Faraday rotator (*col. 12, lines 49 – 52*) which applicants admit is a known optical device employing the magneto-optic effect (*applicants' specification, page 1*). Applicants further admit that a "conventional optical isolator for communication generally has a polarizer, an analyzer, and a magneto-optical body that has a Faraday effect" (*page 2 of specification*) and that the "magneto-optical body is constructed by laminating magnetic substance and ... two types of dielectric substances having different optical characteristics from each other are alternately laminated with each thereof" (*page 4 of*

*specification and Figure 13*). Finally, the Examiner does not find applicants' argument convincing that substituting Si for the SiN films of Inoue et al. would result in the Inoue et al. invention failing to function since applicants disclose a structure essentially identical to Inoue et al. except with the argued against Si for SiN substitution.

Applicants own specification teaches that such a substitution, motivated to occur from Li, would not fail to work in the Inoue et al. invention since both Inoue et al. and applicants' are directed to magneto-optical bodies comprising a magnetic film provided between two types of dielectric films of different index of refraction values.

### ***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (571) 272-1516. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 1773

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kevin M. Bernatz  
Patent Examiner

June 24, 2004